User's Guide

BLM LINEwrench

Atlas Copco BLM

REVISION TABLE

Revision	Date	Author	Description
2006-01	28 Jun 2006	RZ	First Edition
2006-02	13 July 2006	OS	WEEE declaration
2006-03	18 July 2006	RZ	ToolsNet configuration page updated for system and station information. Some minor correction in Wrench settings description
2006-04	18 Sept.	RZ	Added print formats description

ELECTRONIC TORQUE WRENCH

BLM LINEwrench

USER'S GUIDE

Safety Instructions

IMPORTANT

All locally legislated rules with regard to installation, operation and maintenance shall be respected at all times.

WARNING

When using electric products, basic precautions should always be taken, including the following:

- Read all instructions before using the product.
- Do not expose the system to excessive moisture (dripping or splashing), and do not use it near water (near a washbowl, or in a wet basement) or other liquids.
- The product should not be subjected to continuous or excessive shock or vibration.
- For minimum electrical interference, use the product far away from possible sources of electrical noise (arc welding equipment etc).
- There are no user serviceable parts inside the product. Hence, under no circumstances should you open or resume to repair the product. Doing so will invalidate all warranties. Refer all service needs to your local Atlas Copco service personnel.
- Always plug/unplug connection cables with power off.

CAUTION

Danger of explosion if the battery is incorrectly replaced. Replace only with same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to the manufacturer's instructions.

EC Declaration of conformity

- **Individual machinery and safety components:**
  We Atlas Copco BLM – Paderno Dugnano - ITALY declare under our sole responsibility that the product to which this declaration relates, is in conformity with the requirements of the Council Directive of 22 June 1998 on the approximation of the laws of the Member States relating to machinery (98/37/EEC).
- **Information on Waste of Electrical and Electronic Equipment:**
  This product and its information meets the requirements of the WEEE Directive (2002/96/EC) and successive modifications.
  See Manual "ATLAS COPCO BLM Torque Wrenches WEEE parts identification" for WEEE parts identification.
  The products and their components and/or batteries that must be treated as WEEE when at end of life are marked with a crossed trashcan according to WEEE (2002/96/EC). See figure below:

In the European Union, this symbol indicates that products must not be disposed of as unsorted municipal waste but must be dealt with separately, in accordance with the WEEE Directive (2002/96/EC).
At the end of its life, this product should be returned to your local Atlas Copco supplier. Visit Internet page: **http://www.atlascopco.com** to identify your local supplier.

Name of issuer	*Position*	*Signature*
Frédéric Genestout	*General Manager*	
Ovidio Scarpulla	*Product Quality Manager*	

CONTENTS

1. MAIN FUNCTIONS

1.1 Switching-on

The wrench is switched on using the switch on its side. The wrench automatically performs an initialising test when switched on.
CAUTION! The wrench must not be moved or placed in its battery recharging cradle during this test. Once the wrench has been initialised, the message "Ready" appears on the display.

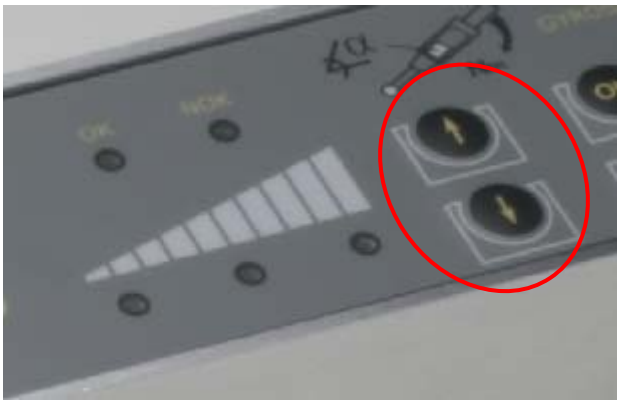
1.2 Battery recharging

The BLM LINEwrench is battery-operated. To recharge the batteries, simply place the wrench in its recharging cradle, which immediately starts recharging the batteries by means of the contacts sunk in this.
CAUTION! Don't try to recharge the wrench when this is switched off.

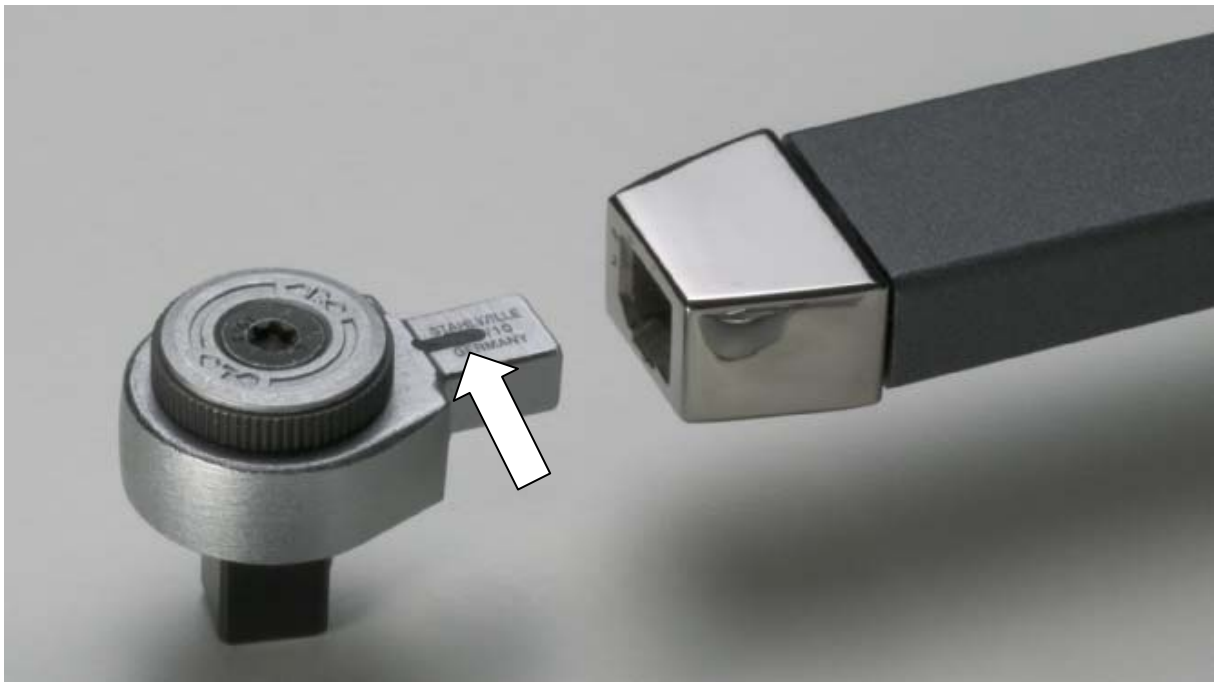
1.3 Choice of Tightening Program

Depending on the model, the BLM LINEwrench comes with or without automatic tool recognition.

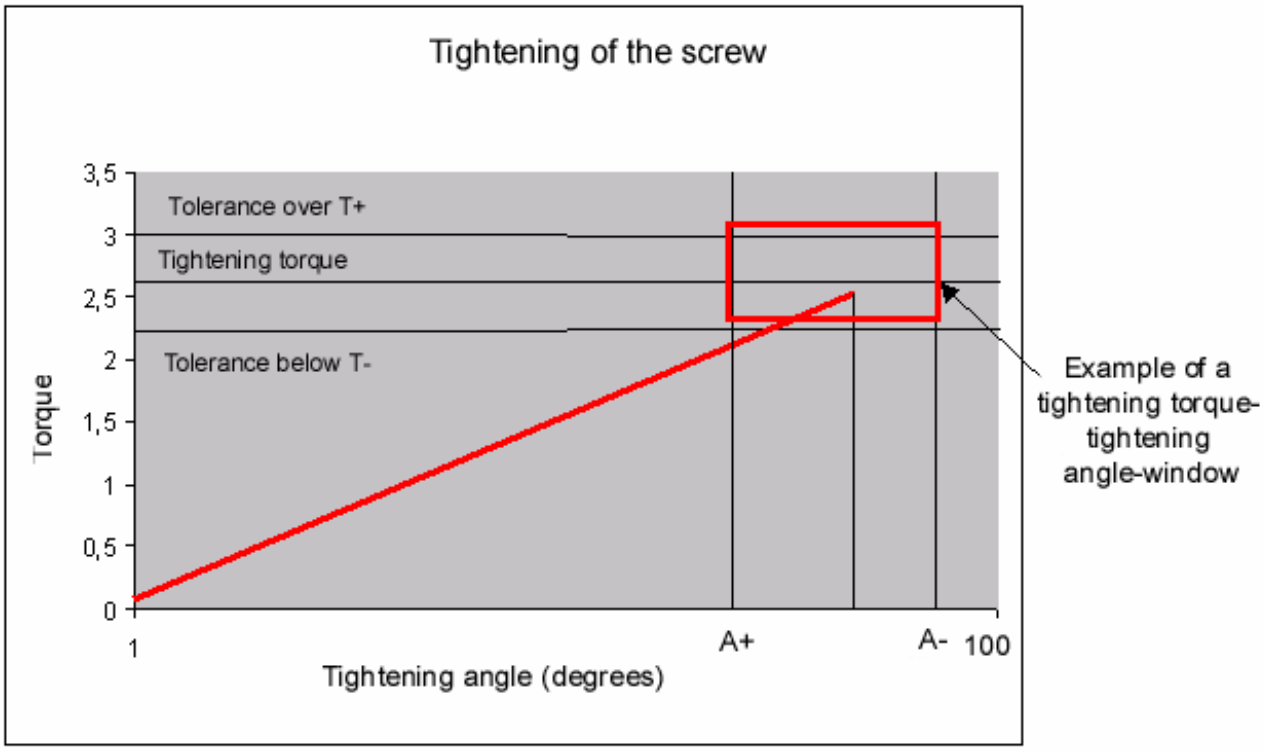
Without automatic tool recognition:
Use the arrow keys to choose the program: the number of the program chosen appears on the display. The wrench can save up to 160 tightening programs (the wrench is programmed using the management program supplied).



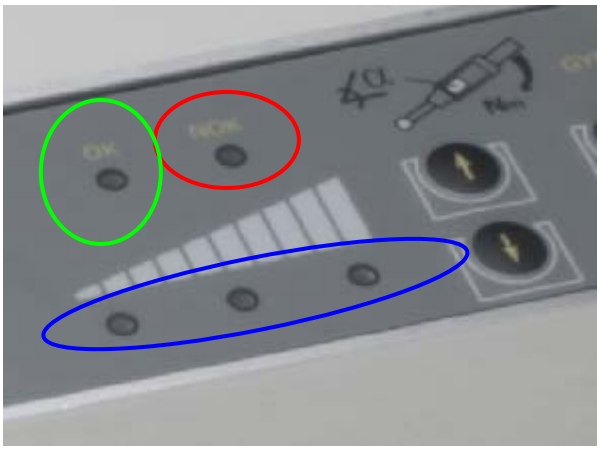
With automatic tool recognition:
The various tightening programs are associated to a tool. Each tool is coded with a number via a "Transponder" mounted in the coupling on the tool.
When the tool is inserted in the wrench, the wrench emits an acoustic signal in confirmation and the name of the tightening program associated to that tool number appears on the display.



1.4 Tightening



The tightening moment can be controlled either by torque or angle. The parameters are set using the management software provided.
The status of the tightening cycle is shown by the three blue LED, each indicating an increase in the torque or angle depending on the control function selected.
Once the tightening cycle has been completed (all 3 blue LED on), the status of the tightening (OK or KO) is indicated by the display and the control LED.
If dealing with a group of several screws (e.g. 4 screws with the same tightening program), the wrench will give the OK or KO status after tightening each screw. Only after correct tightening of all the screws belonging to the group, will the wrench indicate that the group has been completed.

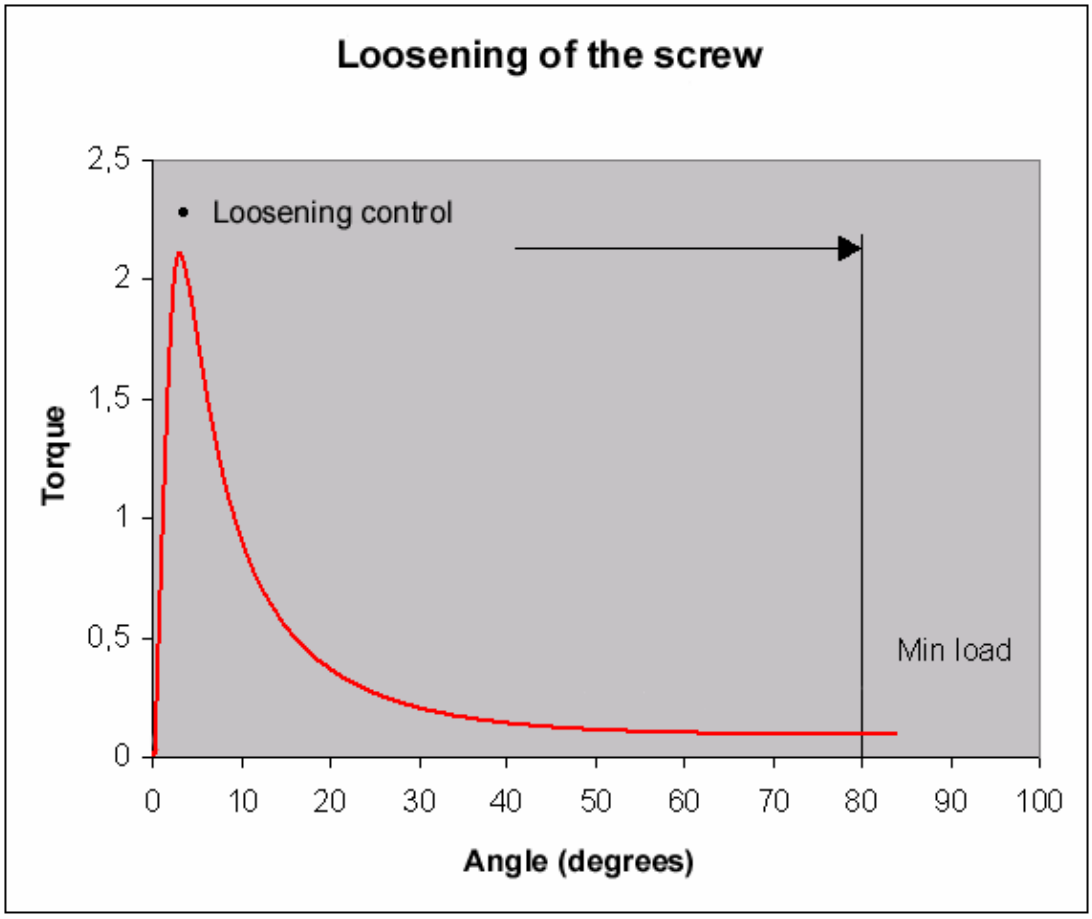


N.B.:
Result OK (automatic acquisition)
Result KO (acceptance only by pressing the red key)

N.B.: If the wrench uses radio transmission, the blue LED will start flashing on completion of the tightening cycle while the data is being sent and then an acoustic signal confirms that transmission has been successful (DO NOT TIGHTEN ANYTHING ELSE DURING THIS STAGE).
If the wrench uses serial transmission, the result will be saved on completion of the tightening cycle and then sent when so required.

1.5 Loosening

Loosening is controlled in exactly the same way as for tightening (only if the programmed cycle foresees this).
The wrench only recognises loosening moment when a set loosening threshold (torque/angle) is reached.



1.6 Printing

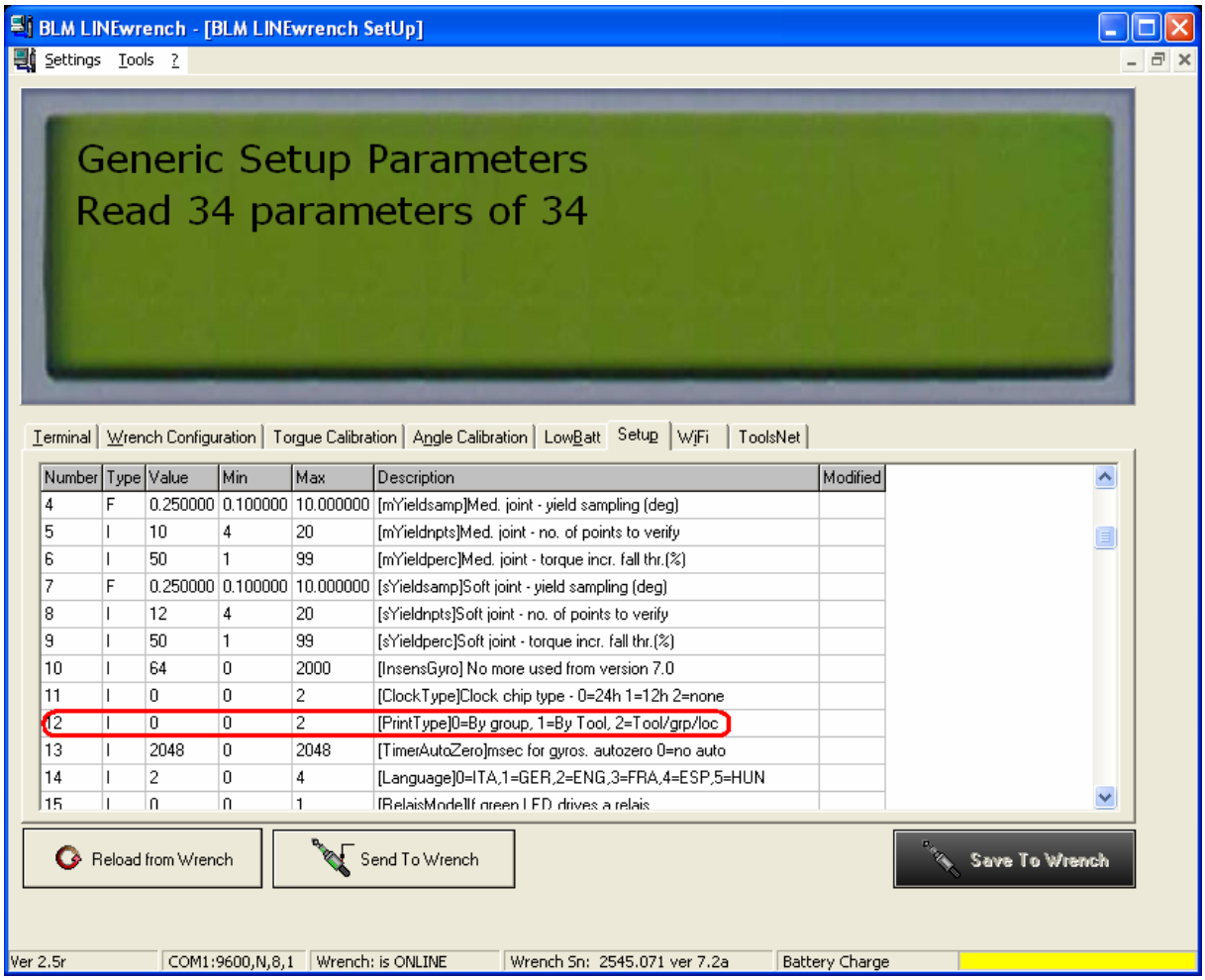
When enabled, LINEwrench can print tightening results directly to a DP8340 series Star printer using the rs232 connection provided either by the battery charger cradle or the serial cable with fisher connector.

Three types of print format are provided:

- Print by group
- Print by tool/program
- Print by group/location

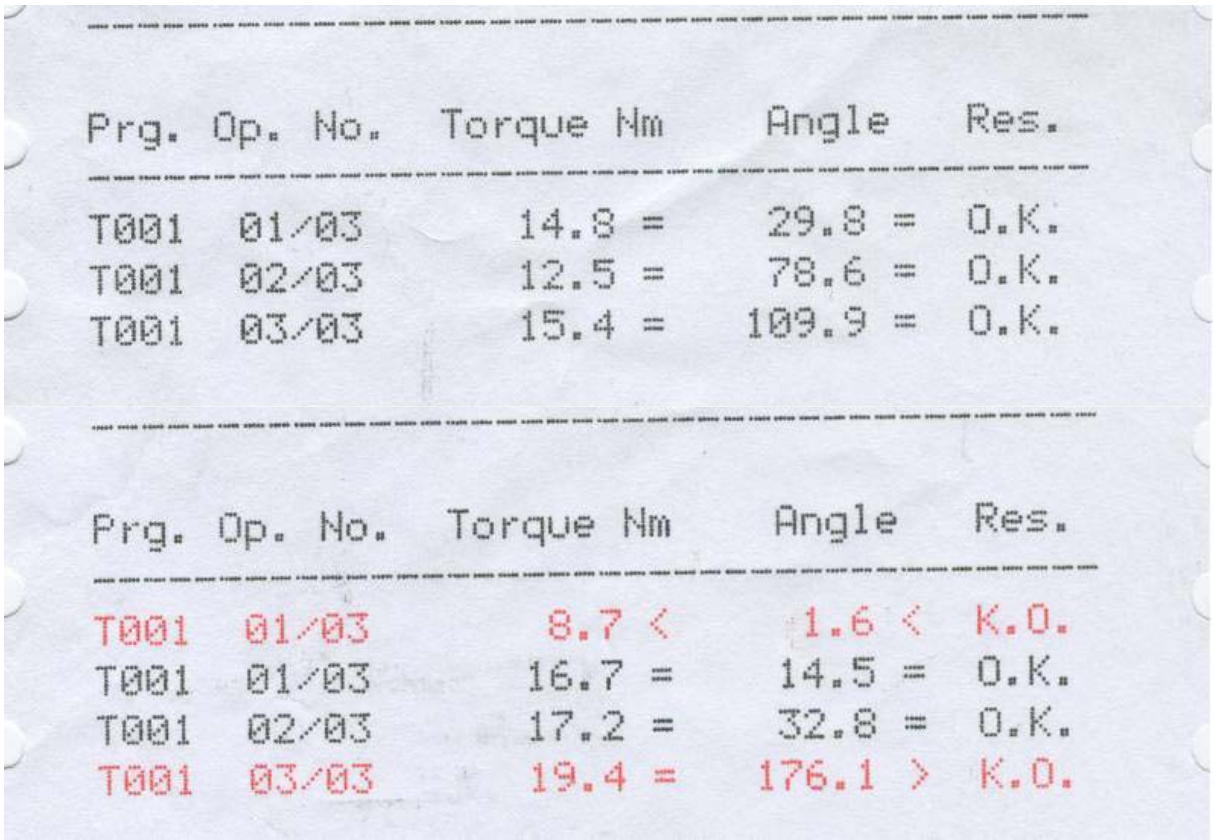
Print type can be selected with the following procedure:

- Connec tLINEwrench to "BLM LINEwrench program"
- Run the "Wrench SETUP" application
- Access "setup" section
- Set the parameter 12 "PrintType" to desired value



Labels are always printed grouped by "VIN" number when scanned.

Print by group:
Results are printed grouped by VIN number and in the same order they have been obtained. The progressive number within a group of screw is printed (ex:.1/3). No date and time is printed.
Example:



Prg.	Op. No.	Torque Nm	Angle	Res.
T001	01/03	14.8 =	29.8 =	O.K.
T001	02/03	12.5 =	78.6 =	O.K.
T001	03/03	15.4 =	109.9 =	O.K.

Prg.	Op. No.	Torque Nm	Angle	Res.
T001	01/03	8.7 <	1.6 <	K.O.
T001	01/03	16.7 =	14.5 =	O.K.
T001	02/03	17.2 =	32.8 =	O.K.
T001	03/03	19.4 =	176.1 >	K.O.

Print by tool/program:

Results are printed grouped by VIN number then by tool/program number. The progressive number within a group of screw is not printed. Date and time is printed for each single tightening

Example:

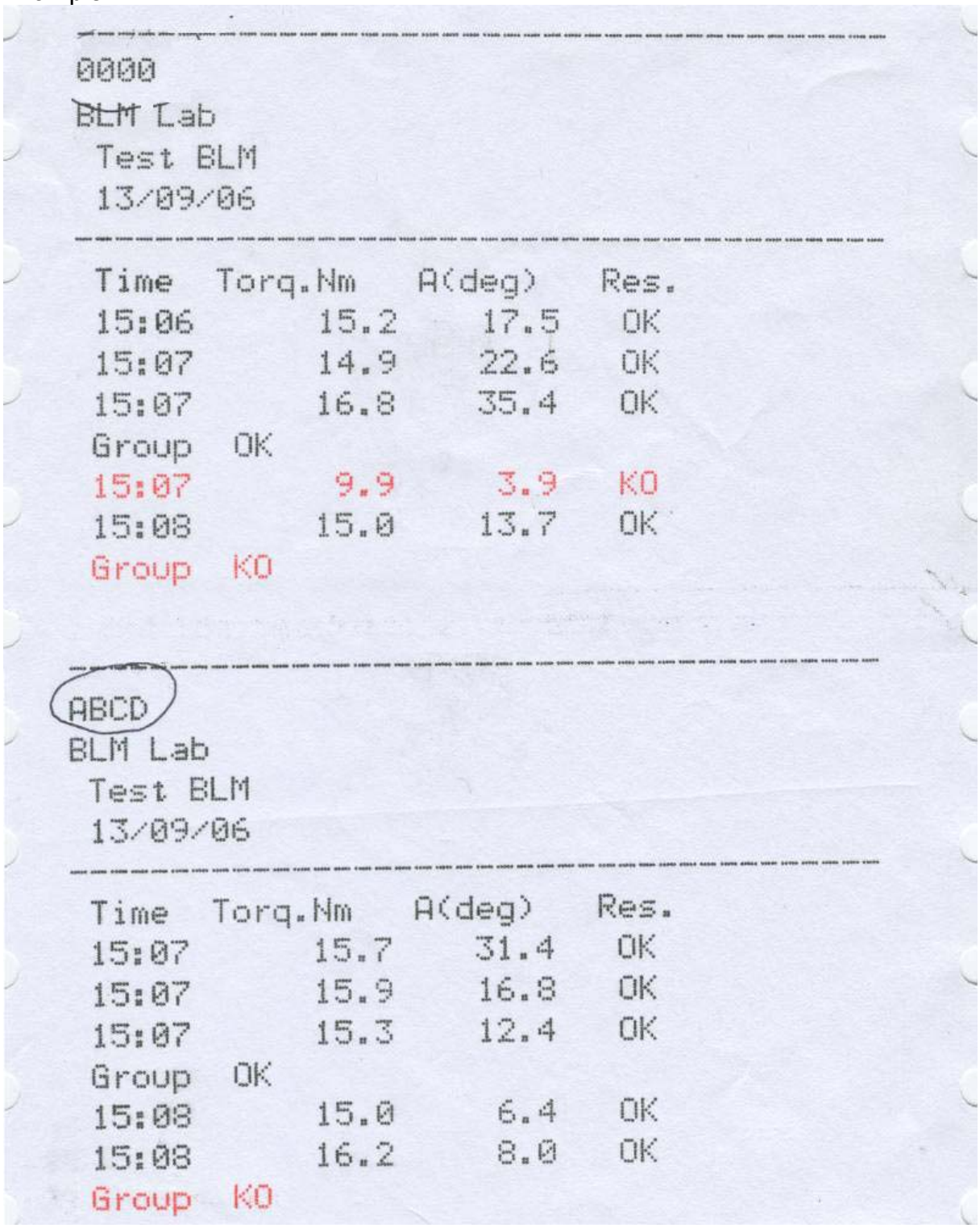
```
--------------------------------------------------
ABCD
Test BLM
--------------------------------------------------
 Date       Time    Torq.Nm  A(deg)   Res.
13/09/06 15:03       14.9    25.5    O.K.
13/09/06 15:03       15.4    29.4    O.K.
13/09/06 15:04       16.0    14.5    O.K.
```

```
--------------------------------------------------
0000
Test BLM
--------------------------------------------------
 Date       Time    Torq.Nm  A(deg)   Res.
13/09/06 15:03       14.8    22.6    O.K.
13/09/06 15:04       15.2    24.1    O.K.
13/09/06 15:04       14.7    28.6    O.K.
```

Print by group/location:

Results are printed grouped by VIN number then by tool/program number. Program namen, location name and date are printed in the header of each label. After each group of screws with the same tool/program a group status condition is printed

Example:



```
0000
BLM Lab
 Test BLM
 13/09/06

 Time   Torq.Nm    A(deg)    Res.
 15:06      15.2     17.5    OK
 15:07      14.9     22.6    OK
 15:07      16.8     35.4    OK
 Group  OK
 15:07       9.9      3.9    KO
 15:08      15.0     13.7    OK
 Group  KO

ABCD
BLM Lab
 Test BLM
 13/09/06

 Time   Torq.Nm    A(deg)    Res.
 15:07      15.7     31.4    OK
 15:07      15.9     16.8    OK
 15:07      15.3     12.4    OK
 Group  OK
 15:08      15.0      6.4    OK
 15:08      16.2      8.0    OK
 Group  KO
```

2. MAINTENANCE

Daily

- Visually check the wrench for mechanical damage
- Visually check the wrench for electronic faults
- Check that the battery recharging cradle is clean

Weekly

- Clean the battery recharging cradle, especially the contacts
- Clean the recharging contacts on the wrench

Every 6 months (Recommended)

- Replace the batteries

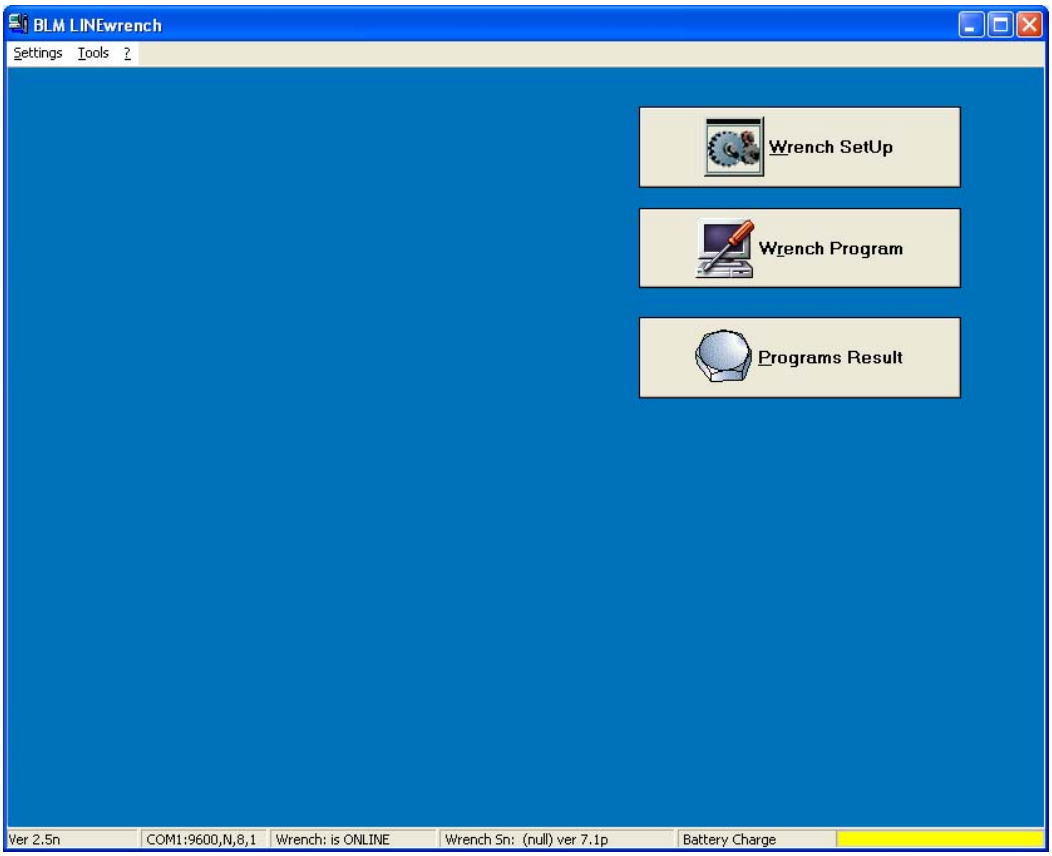
Every 12 months

- Wrench certification

3. BLM LINEwrench Software

3.1 Starting the program

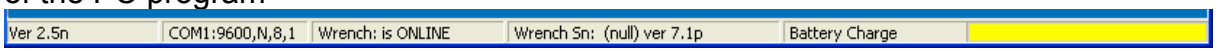
It is possible to start the program by clicking on the windows start button, selecting the "programs" or "all programs" group and browsing it to find the installation group chosen during installation (BLM by default) and finally clicking on BLM LINEwrench.
At startup the following start windows will appear:



3.2 Connecting wrench to the program

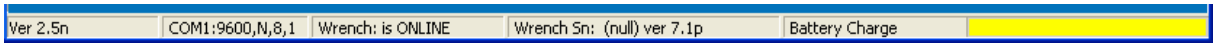
Communication between BLM LINEwrench and BLM LINEwrench PC software is performed via Rs232 connection.
To communicate with the PC the wrench must therefore be connected to a free RS232 COM port using the serial cable that comes with it.
The wrench can be connected at any time to the PC and it will be automatically recognized

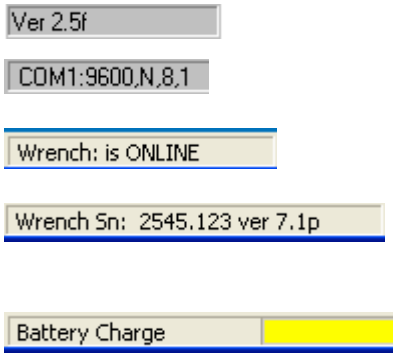
_**CAUTION!** With some wrenches firmware version you will need to run the program first and then switch on the wrench after plugging the serial cable.
+
The correct communication with the wrench can be verified checking the bottom bar of the PC program



3.3 Data shown on status bar

The StatusBar at the bottom of the main page displays some basic data indicating the status of the wrench and the program being used:





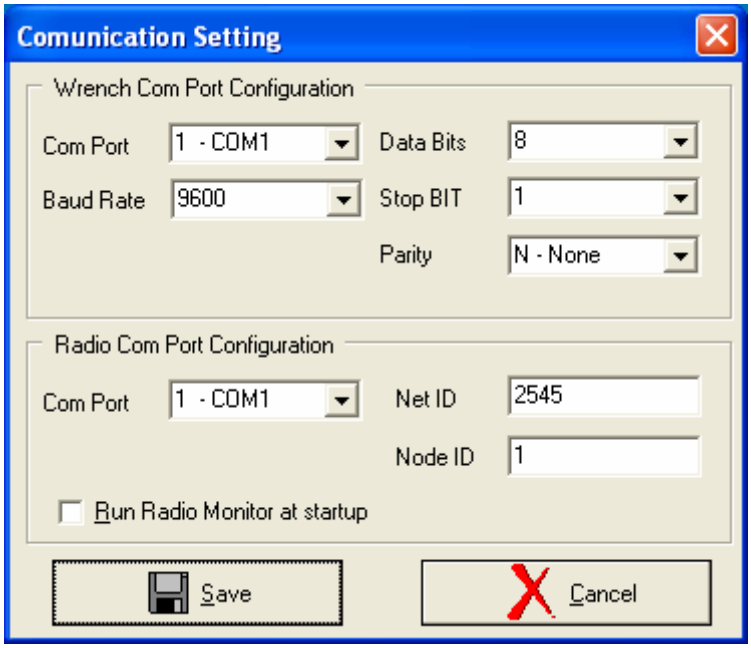
BLM LINEwrench software version
Setup values for the serial port used to communicate with the wrench
Current wrench status: shows whether or not the software is communicating with the wrench
If the wrench is connected, this indicates its serial n° and the firmware version
The wrench battery charging level:

- Yellow: Recharging
- Blue: Charged
- Red: Low battery

4. Program Menus

These menus let you set various general program settings.

4.1 Communication Setup



The top section lets you set up the serial port used by the program to communicate with the wrench.

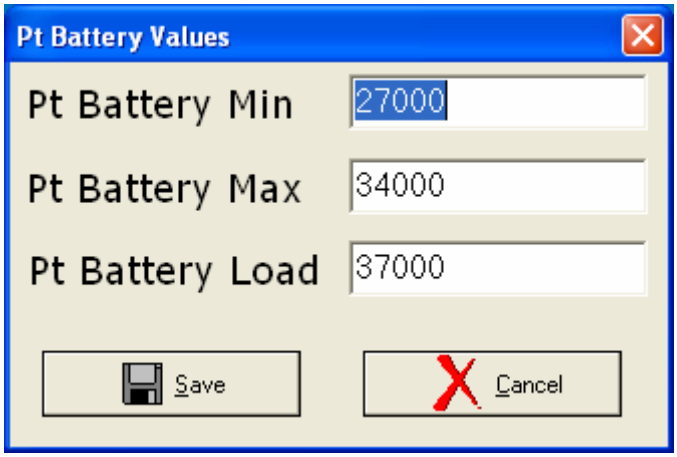
The bottom section lets you set up the parameters for the serial port used for the "433" radio.

Net ID The radio network ID: this must be the same as that set for the wrench setup
Node ID The radio unit ID: this identifies the node that must receive the data from the wrench

"Run Radio Monitor on Start-up" This lets you access reception of the results via radio when you run the program, without needing to do any other operations.

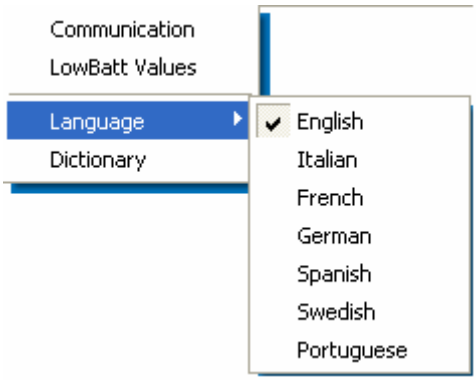
N.B.: You cannot use the same serial port for both interfaces.

4.2 Low Battery



This page lets you set up the thresholds for the battery charge status. These settings do not affect how the wrench works in any way, but simply alter the way the battery status bar is shown in the main page.

4.3 Language

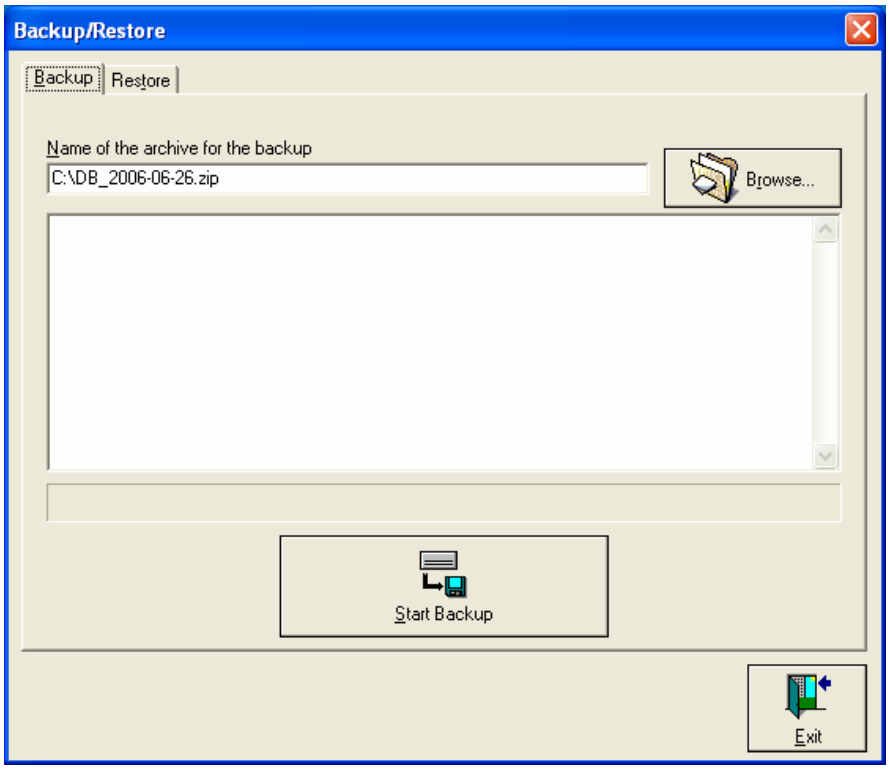


This menu lets you select the language used by the program: if you need to change the dictionary items, click on the "dictionary" option.

After selecting the language (English - Italian - French - German - Spanish - Swedish - Portuguese), you need to reboot the application to effectively change the display language.

4.4 Utilities

The Utility menu lets you create a BackUp of the database containing the programs and the wrench results or restore the original settings (Restore). The BackUp option also lets you save the files for the dictionary (translations).



To create a backup or restore a database, select the zip file created earlier and then press "BackUp" or "Restore".

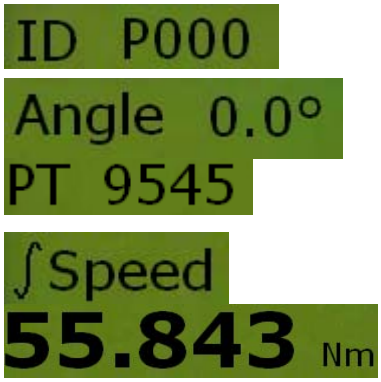
We recommend creating a backup at regular intervals to minimise any lost data should the system crash.

5. Wrench Setup

This setup page lets you view and change the wrench parameters and calibration settings; it is split into various sections (types of settings).

5.1 Terminal

The terminal section displays the main data read by the wrench. This function lets you perform a free torque/angle test without using a specific program.

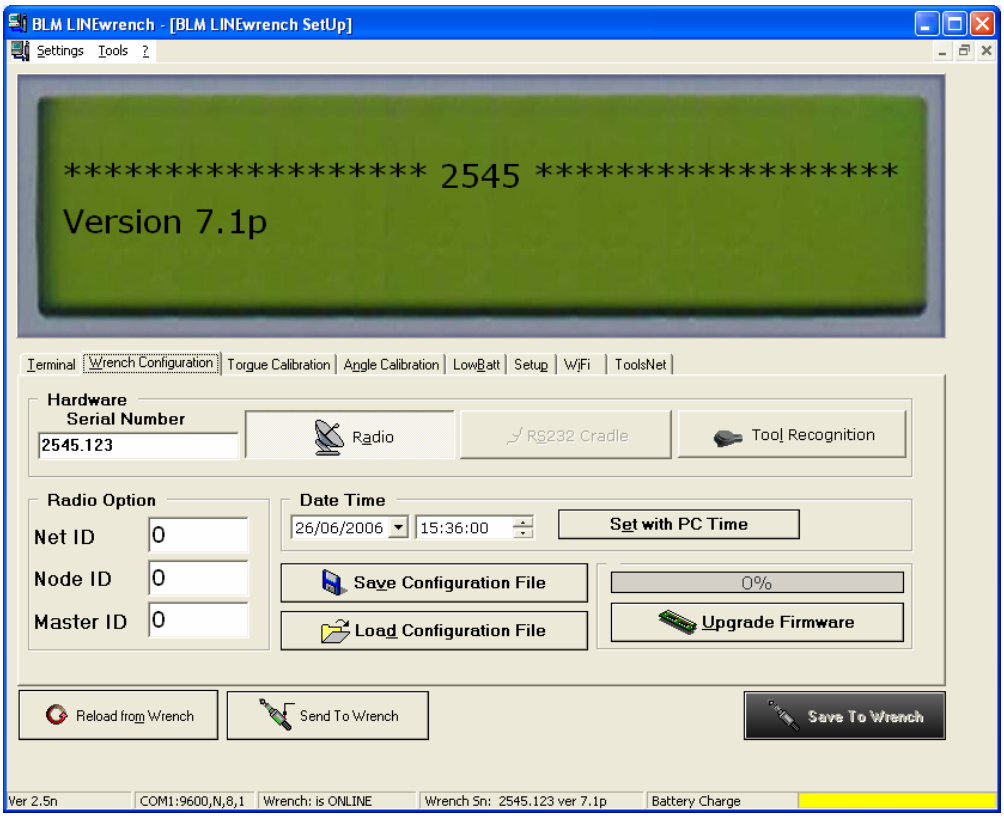


Tool number (ID) currently in the wrench (if the wrench allows for tool recognition)
Angle read by the gyroscope

Torque value (in points) given by the A/D converter
Angular speed integer read by the gyroscope

Torque read by the wrench

5.2 Wrench Settings



This section lets you set:

Serial number°

This must be the same as that printed on the back of the wrench.

Radio

Enable this function if the wrench is fitted with a radio unit (433MHz, BlueTooth, WiFi) used to send the tightening data.

N.B.: You should also set the type of radio on the wrench (check the relevant parameter in the settings setup table, see chapter 5.6).

Rs232 Cradle

Enable this function if the wrench has no radio and so exchanges tightening data via the battery recharging cradle.

N.B.: You cannot enable both the Radio and Cradle functions at the same time.

Tool Recognition

Enable this function if the wrench allows for automatic tool recognition.

Radio Options

This lets you set or view redio network parameters if the wrench is fitted with a 433 MHz radio unit:

NetID: Radio network ID

NodeID: ID identifying the wrench during radio transmission

Master ID: radio unit ID: the node that must receive the data from the wrench

Date and Time

LINEwrenches have an onboard clock that lets you set the date and time. Use "Set Time via PC" to synchronise the wrench clock with that of the PC you're using.

Save/Restore Wrench Setup

(*Save Setup File*)
This lets you save ALL the wrench setup in a specific file (excluding programs and results)

(*Load Setup File*)
This lets you load a previously saved setup file on a wrench

CAUTION! Every wrench has its own setup; if you load a different setup file on a wrench (e.g. saved from a wrench with a different serial n°), you run the risk of malfunctions and incorrect readings!

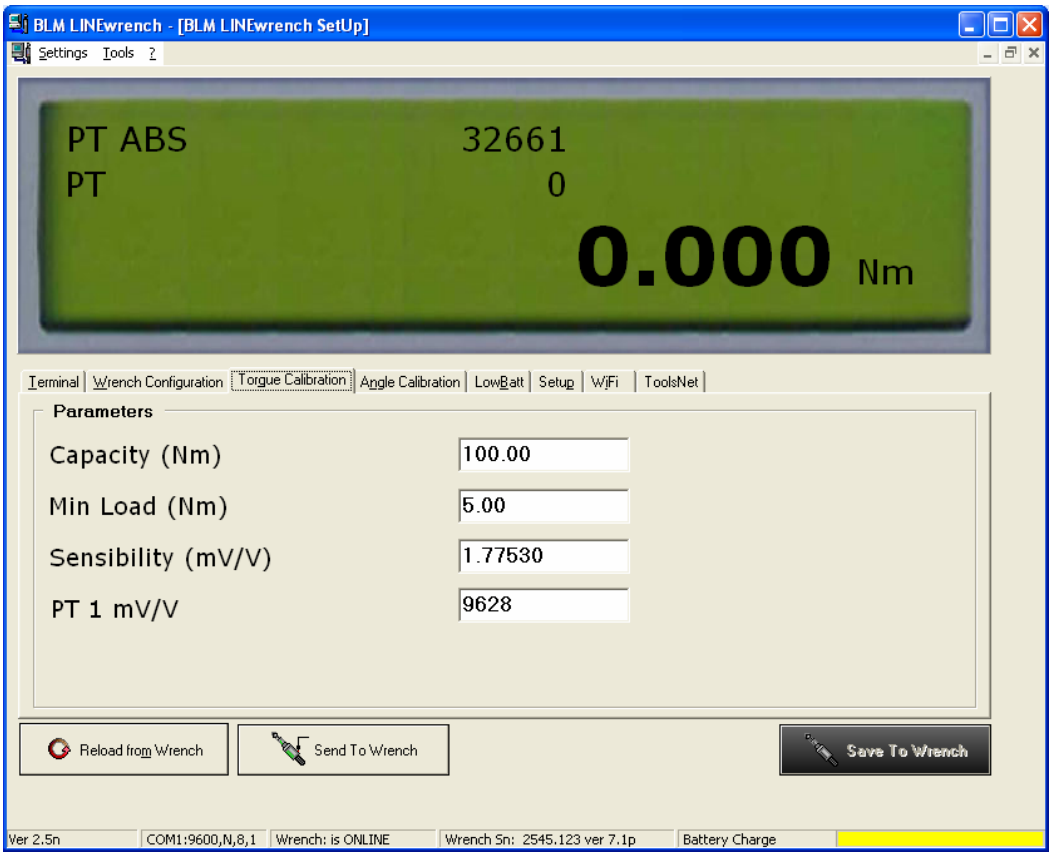
Update Firmware

This function lets you update the firmware on the wrench.
If this function fails (or the update doesn't start) and the wrench doesn't start at reboot, follow these steps:

1. Switch off the wrench
2. Close the BLM LINEwrench program
3. Run the BLM LINEwrench program again
4. Return to the Settings page in the Wrench Setup section
5. Press the Firmware Update button and select the file with the firmware image
6. Switch the wrench on again.
7. Wait fot the progression bar of the upload to reach 100%

N.B.: After changing the settings, press Send to Wrench and then Save to Wrench. If you fail to do so, all the changes will be lost!

5.3 Torque Calibration

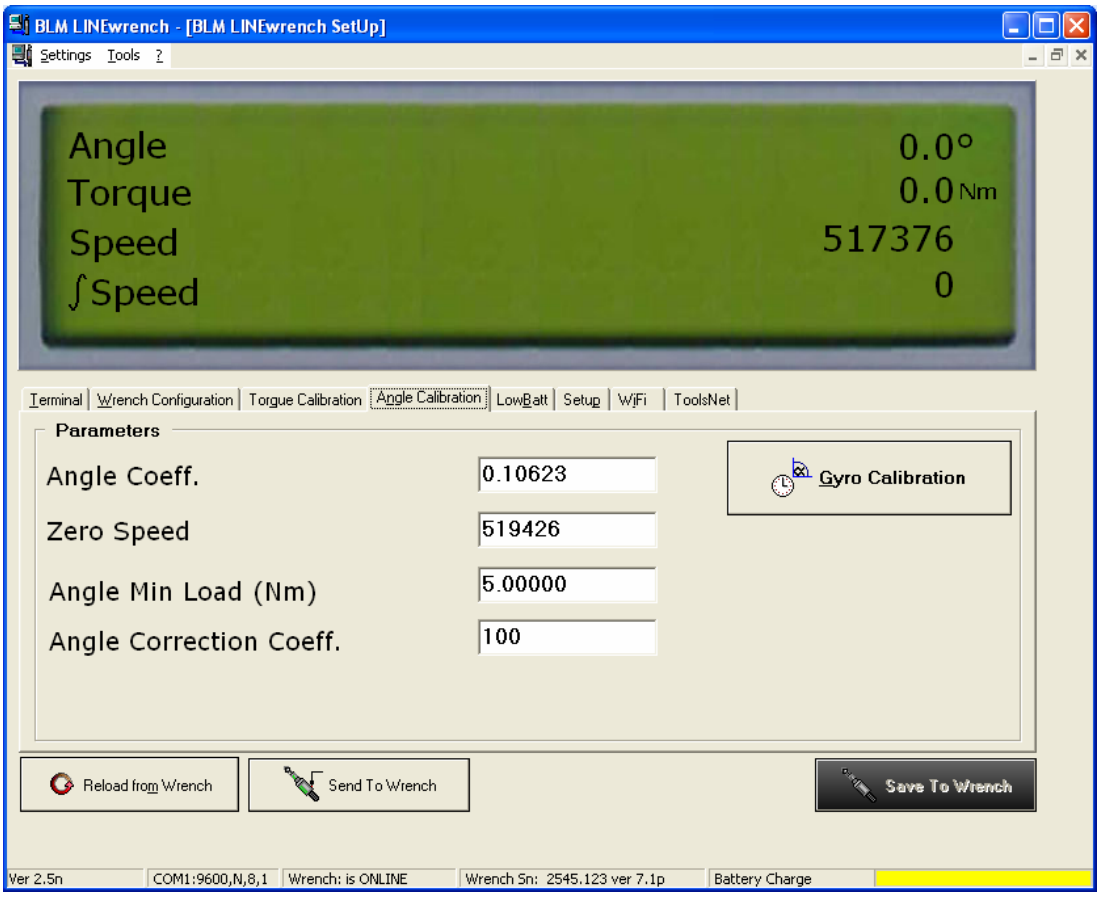


The Torque Calibration section lets you set and view the setup values for the reading of the torque by the wrench.
CAUTION! Incorrect changes to the settings may lead to major errors in the reading of the angle and torque or wrench malfunctions.

Capacity	The max applicable torque for the wrench
Min Load	The min torque the wrench can read
Sensitivity (mV/V)	The sensitivity of the torque transducer
PT 1 mV/V	The value (in points) for a reading of 1 mV/V by the electronics (expressed in points by the A/D converter).

N.B.: After changing the settings, press Send to Wrench and then Save to Wrench. If you fail to do so, all the changes will be lost!

5.4 Angle Calibration



The Angle Calibration section lets you set and view the setup parameters for reading of the angle by the wrench.
CAUTION! Incorrect changes to the settings may lead to major errors in the reading of the angle and torque or wrench malfunctions.

Angle Coeff.
This is a parameter used by the wrench to convert the gyroscope reading (express as points) into degrees.

Zero Speed
This is the reading of the angular speed read by the gyroscope (expressed in points) when the wrench is not moving. This value is set during the wrench calibration.

Min Angle Load
The threshold (Nm) above which the wrench starts counting the angle.

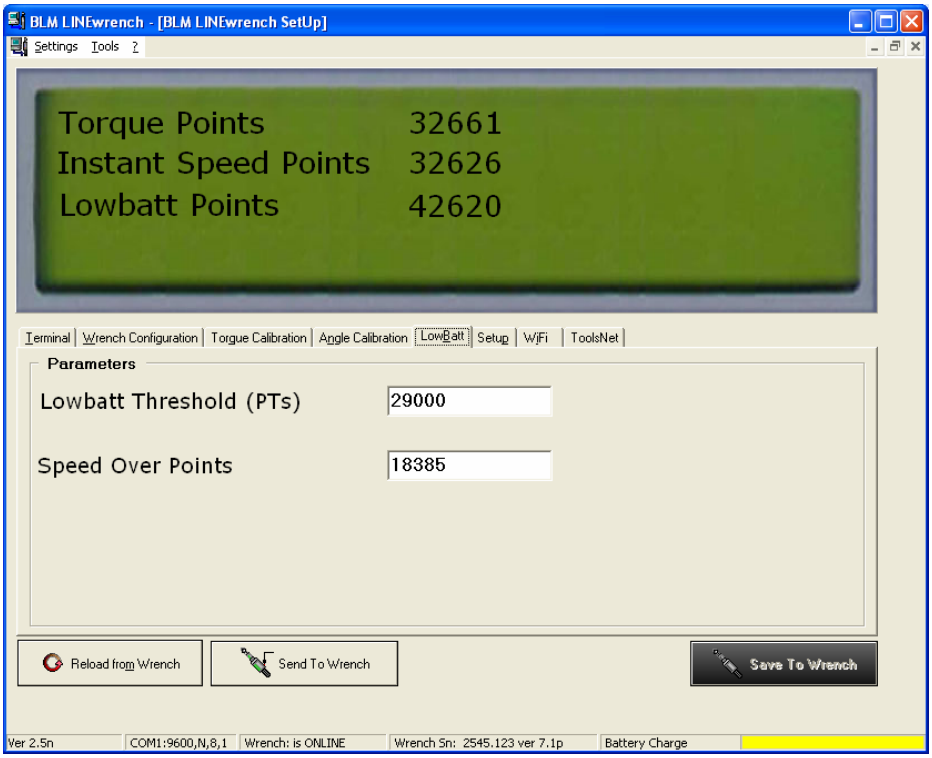
Angle Correction Coeff.
This parameter is used to correct the estimated angle of rotation of the screw in proportion to the torque read by the wrench transducer and so take into account any mechanical torsion in the wrench.

Gyroscope Calibration

Use this function to calibrate the gyroscope. Do not allow the wrench to move during this operation.

N.B.: After changing the settings, press Send to Wrench and then Save to Wrench. If you fail to do so, all the changes will be lost!

5.5 Battery Points



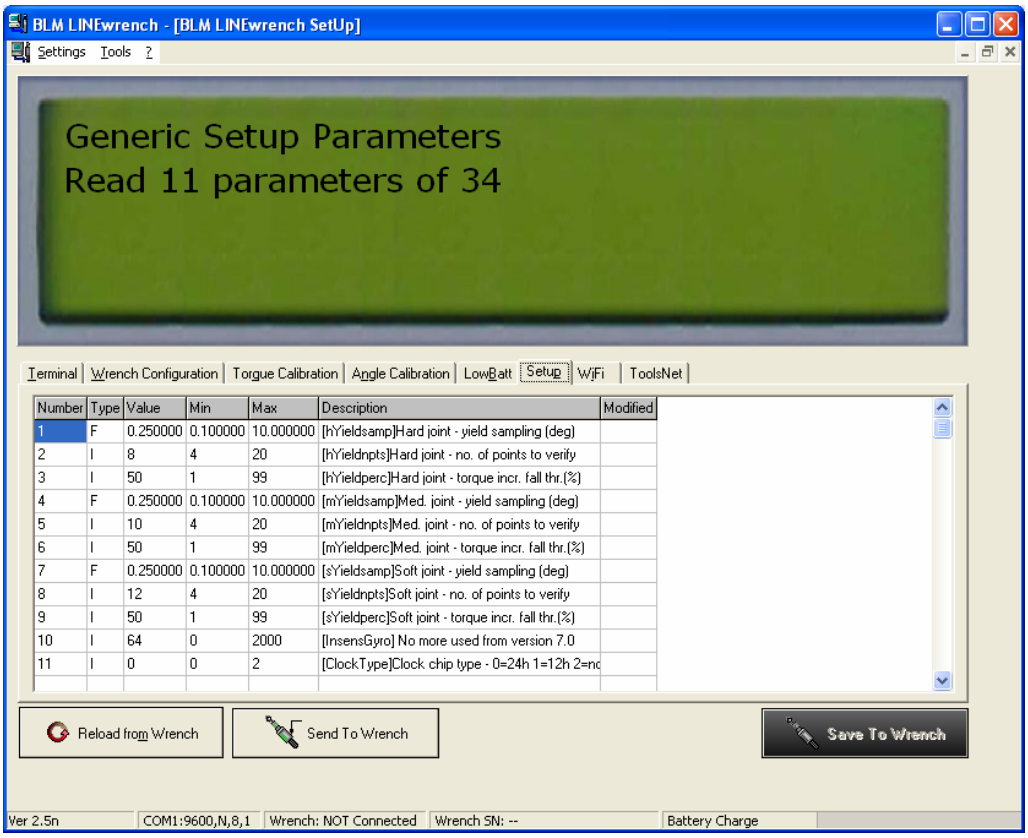
The Battery Points and SpeedOver section lets you view and set the setup parameters for the battery charge status and the Speed Over.
CAUTION! Incorrect changes to the settings may lead to major errors in the reading of the angle and torque or wrench malfunctions.

LowBattery Threshold:
This parameter shows the min reading (expressed in points) of the battery charge below which the wrench starts warning you that you need to recharge the battery.

Speed Over
This parameters shows the angular speed reading (expressed in points) beyond which the wrench starts emitting an error signal, warning you that the screw has been tightened too fast.

N.B.: After changing the settings, press Send to Wrench and then Save to Wrench. If you fail to do so, all the changes will be lost!

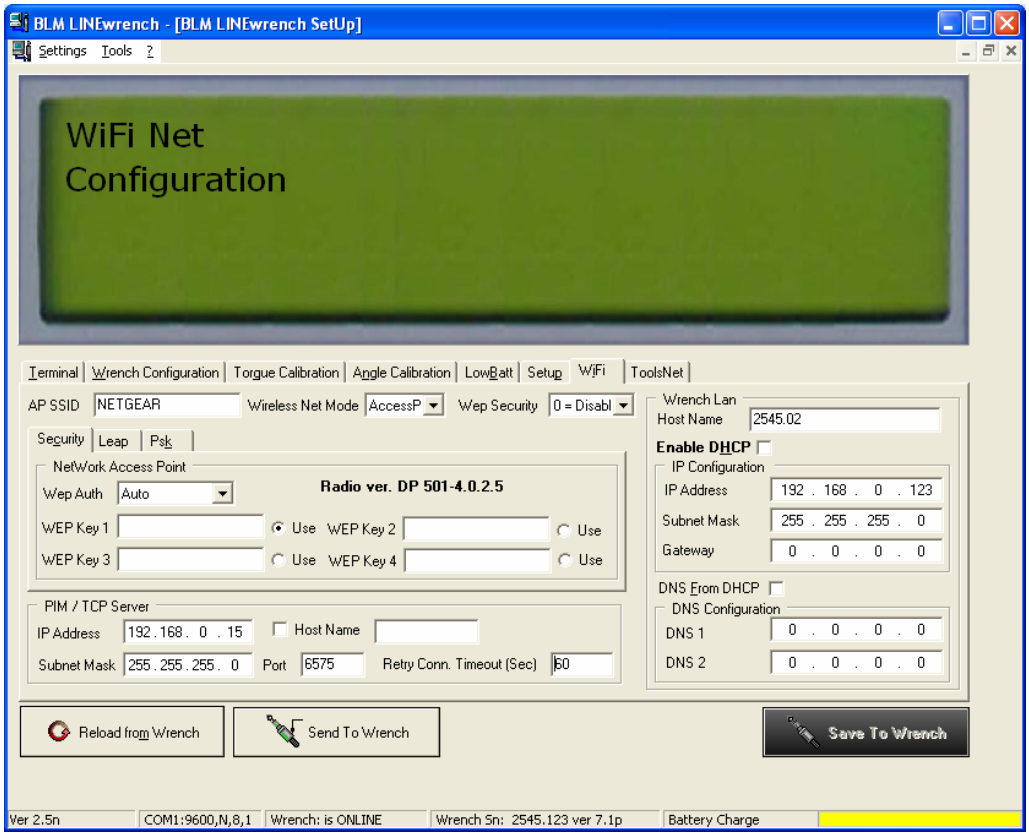
5.6 Settings



The Settings parameter lets you view and set certain "generic" settings. See the description of each parameter for full details of its meaning.
CAUTION! Incorrect changes to the settings may lead to major errors in the reading of the angle and torque or wrench malfunctions.

N.B.: After changing the settings, press Send to Wrench and then Save to Wrench. If you fail to do so, all the changes will be lost!

5.7 WiFi Network Setup



This section lets you view and set the parameters for the way the wrench works when connected to the ToolsNet or a WiFi network.
CAUTION! Incorrect changes to the settings may lead to major errors in the reading of the angle and torque or wrench malfunctions.

AP SSID

ID for the Access Point used to connect the wrench.

Wireless Net Mode

Network operating mode. This can be:

A Infrastructured Access Point
P Peer to Peer

Wep Security

This parameter shows the security mode used when sending data. This can be:

Disabled	No data encrypting
Wep-64	Data encrypting at 64Bit
Wep-128	Data encrypting at 128Bit
Wep-psk	Data encrypting with psk (see psk)
Wep-Leap	Data encrypting with Leap (see Leap)

Wep Auth
This parameter shows the type of authentication to be used. The possible settings are:

None	No authentication level
Open	Authentication with "Open" key algorithm
Shared	Authentication with "Closed" key algorithm
Both	Both "Open" and "Closed" modes

Wep Key 1…4
These parameters show the encryption key values. There are up to 4 possible encryption keys; you can also select which key to use as the default setting.

Leap.
If using the Leap protocol, you need to specify the Username and Password to access this.

Psk
If using the psk protocol, you need to specify the shared key for the connection.

Pim-TCP Server – Indirizzo IP
The PIM – TCP Server section lets you set the parameters needed for dialog with the Server PIM or other TCP-IP servers.

IP address
This parameter shows the IP address for the PIM or TCP server.

SubnetMask
This parameter shows the Subnetmask ID for the network used by the server/PIM.

Host Name
This parameter shows the name of the PIM or TCP server network.

Port
The number of the TCP port used by the PIM or TCP server.

Retry Connection TimeOut
This is the time delay (expressed in seconds) before the next attempt at connection after an error.

Wrench LAN
This section lets you set the network setup data for the wrench.

Host Name
This parameter shows the name of the network used by the LINEwrench.

Enable DHCP
If enabled, this option tells the wrench that its IP Address must be assigned by a DHCP server.

IP Address
The IP address of the wrench. This parameter is only enabled if the Enable DHCP option has not be selected.

Subnet Mask
The SubnetMask that the wrench must use to communicate on the TCP network. This parameter is only enabled if the Enable DHCP option has not be selected.

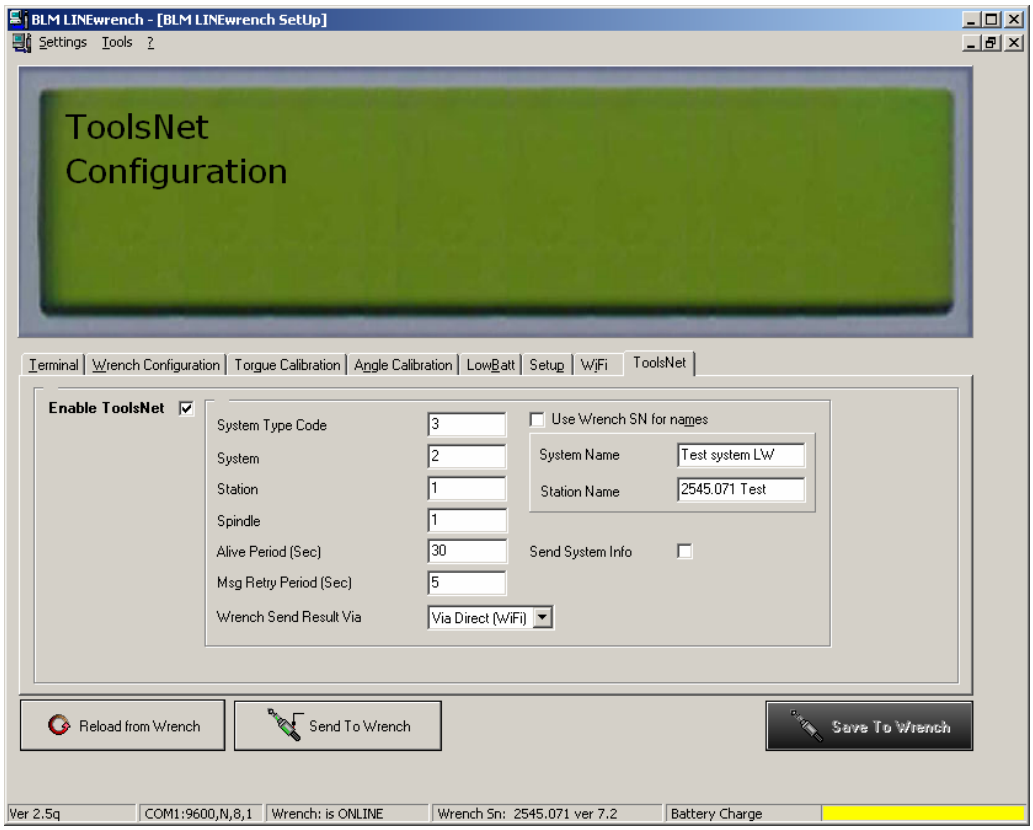
Default Gateway
The default Gateway that the wrench must use. This parameter is only enabled if the Enable DHCP option has not be selected.

DNS from DHCP
When this option is set, the wrench uses the DNS established by the DHCP server.

DNS1 and DNS2
Primary and secondary DNS that the wrench must use to communicate on the TCP network. This parameter is only enabled if the Enable DHCP option has not be selected.

N.B.: After changing the settings, press Send to Wrench and then Save to Wrench. If you fail to do so, all the changes will be lost!

5.8 ToolsNet Setup



System Type Code
The ToolsNet code for the system type used.

System Number
ID number for the ToolsNet system.

Station Number
ID number for the ToolsNet station.

Spindle Number
Spindle number for configuration in ToolsNet data base

Alive period
Period to send keep alive messages to ToolsNet server

Message Retry Period
Time between 2 retries to send a message

Wrench sends parameters via
This option lets you set whether the wrench is to send the parameters via the WiFi network or via NetComBox.

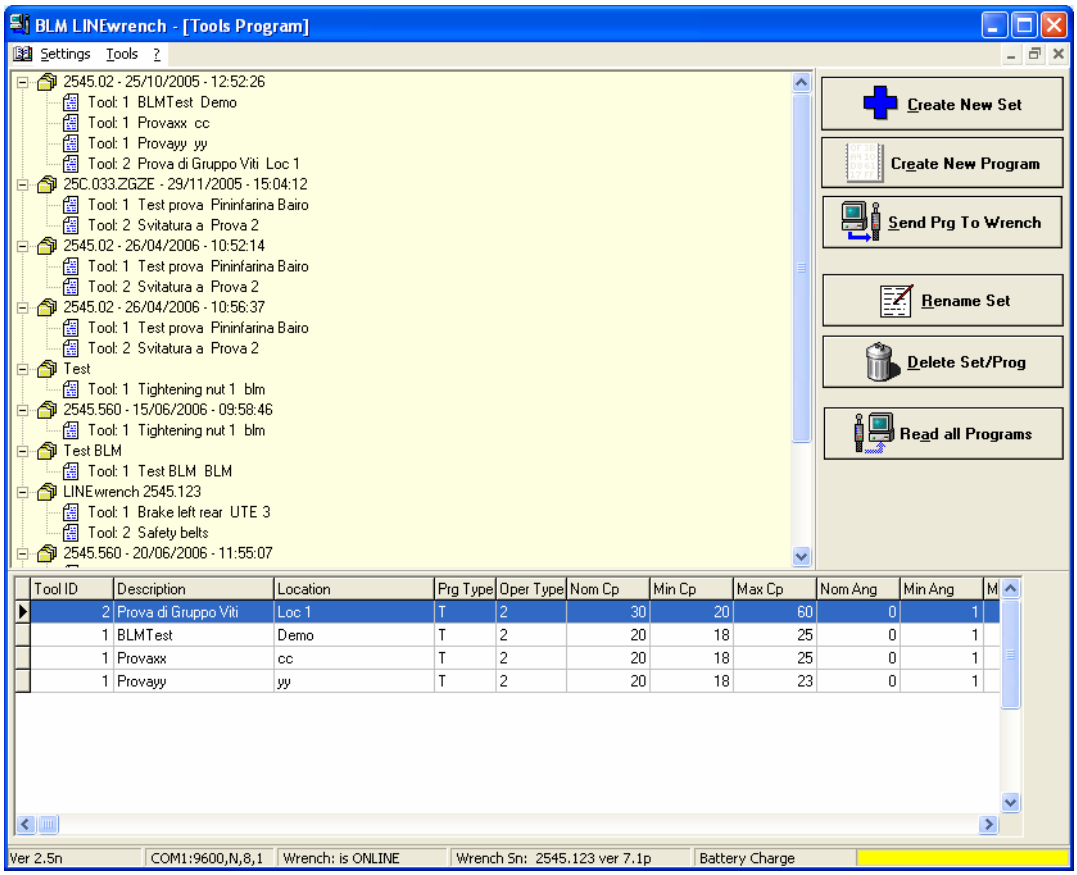
Use wrench SN for names
This checkbox set if the wrench has to use automatically its serial number as System name and Station name when creating the message to send system information to ToolsNet. When active it disables the System name and Station name filelds in this page and overrides their contents with wrench serial number.
It is active by default.

System name
The name of the system to which the wrench belongs, it is used to send the system info telegram to ToosNet and it is used only if the "Send System info" checkbox is selected.
When "Use wrench SN for names" checkbox is selected the filed editing is disabled.

Station name
The name of the Station, it is used to send the system info and station info telegram to ToosNet.
When "Use wrench SN for names" checkbox is selected the filed editing is disabled.

Send System info
This checkbox enables the wrench to send the system info telegram to ToolsNet.
If the system has not been already defined in ToolsNet this will make it add a new system automatically.
CAUTION!! If the system already exists its data will be overridden by the new data sent by the wrench each time it connects to ToolsNet.
By default wrenches are enabled to send system info telegram and to use their serial number as System name and Station name.
If more than one wrench belongs to the same system only one of them should define the system by selecting this checkbox the other should only be programmed to have the same System number.

6. Tool Programming



You can save up to max 128 tool parameters on each wrench [(1).]

The programs must be "bunched" in **Sets**. Each set normally holds all the programs for a specific wrench.

The top section of this page shows the various sets with their programs (tree mode).

The bottom section shows the program data for the chosen set. Select a program and its data are displayed.

This lets you create a new set of programs

This lets you access the "Create a new program" page

This lets you send the selected program to the wrench. If you select a set, the entire set of programs will be sent to the wrench

This lets you rename the set of programs

This lets you delete the selected program or set from the database (NOT from the wrench)

This lets you receive all the programs on a wrench. A set is automatically created with a name consisting of the serial number of the wrench plus the date and time [2]

Created programs are stored in a local database; you can thus create/change/delete programs without having to connect the wrench to the PC.

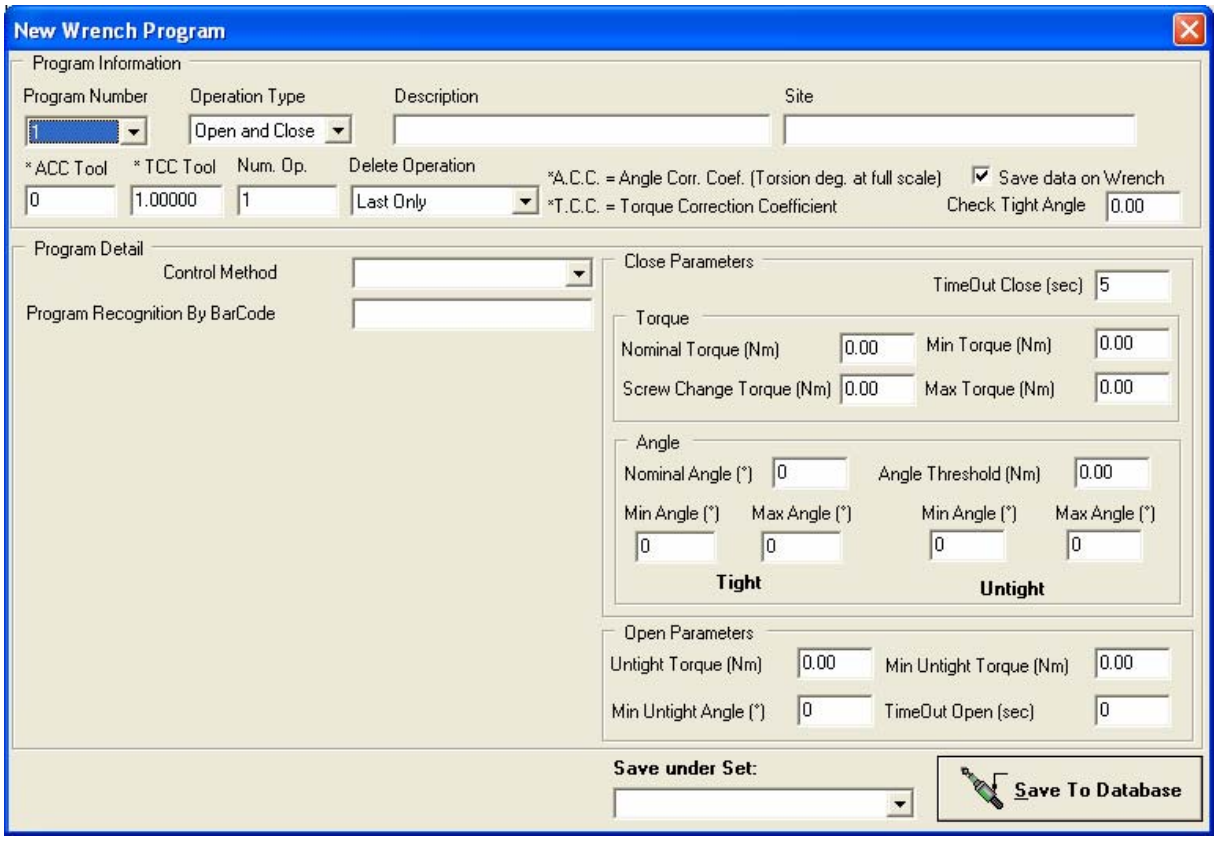
[1] **Caution!** The number of programs that the wrench can store varies depending on the firmware version and the wrench model.

[2] This operation takes a few minutes to complete the processing.

6.1 Creating a tool program

Press 

to create a tool program.



Enter the operating parameters for the program.
The various fields are explained below:

Program Number	ID of the tool that needs to use this program
Operation Type	Operation type (unscrewing, tightening or unscrewing/tightening)
Description	Free description of the operation
Location	Free description of the location of the wrench (if any)
ACC Tool	Angle correction coefficient for the current tool (1)
TCC Tool	Torque correction coefficient for the current tool (2)
Operation N°	Operation number required (number of screws to be tightened/unscrewed)
Cancel	If you make a mistake, you can decide whether to repeat the last tightening/unscrewing or the entire set of operations (provided more than one screw is involved)
Save data to wrench	Flag indicating whether or not the wrench should save the results of the operation in its flash memory
Tight.Angle Control	The value of the angle used to check whether the screw is already tightened. On reaching the min set torque, the program checks whether the angle is less than (or equal to)

	this value. If less, the wrench displays the "Screw already tightened" message.
Control Method	Type of control method: Torque with angle window or Angle with torque window
Prog. Recognition via BarCode	This option lets you select a program using the barcode read by the laser scanner (if fitted)
Tightening TimeOut	Max time for the tightening operation before the wrench generates an error message (i.e. if the operation takes too long)
Nominal Torque	Nominal tightening torque
Min Torque	Min tightening torque
Max Torque	Max tightening torque
Change Screw Threshold	Max torque, beyond which you need to change the screw
Nominal Angle	Nominal tightening angle
Count Threshold Angle	Threshold (torque) beyond which the wrench starts to count the angle
Min Angle (Tight.)	Min tightening angle
Max Angle (Tight.)	Max tightening angle
Min Angle (Unscrew)	Min unscrewing angle (if foreseen)
Max Angle (Unscrew)	Max unscrewing angle (if foreseen)
Unscrewing Torque	Unscrewing torque (if foreseen)
Min Unscrew Torque	Min unscrewing torque (if foreseen)
Max Unscrew Torque	Max unscrewing torque (if foreseen)
Unscrewing TimeOut	Unscrewing Timeout (if foreseen)
Save to Set	The set you want to save the program in

After saving a program, it is stored in the local PC database.

To transfer it to the wrench, select the (or set of programs) and then press

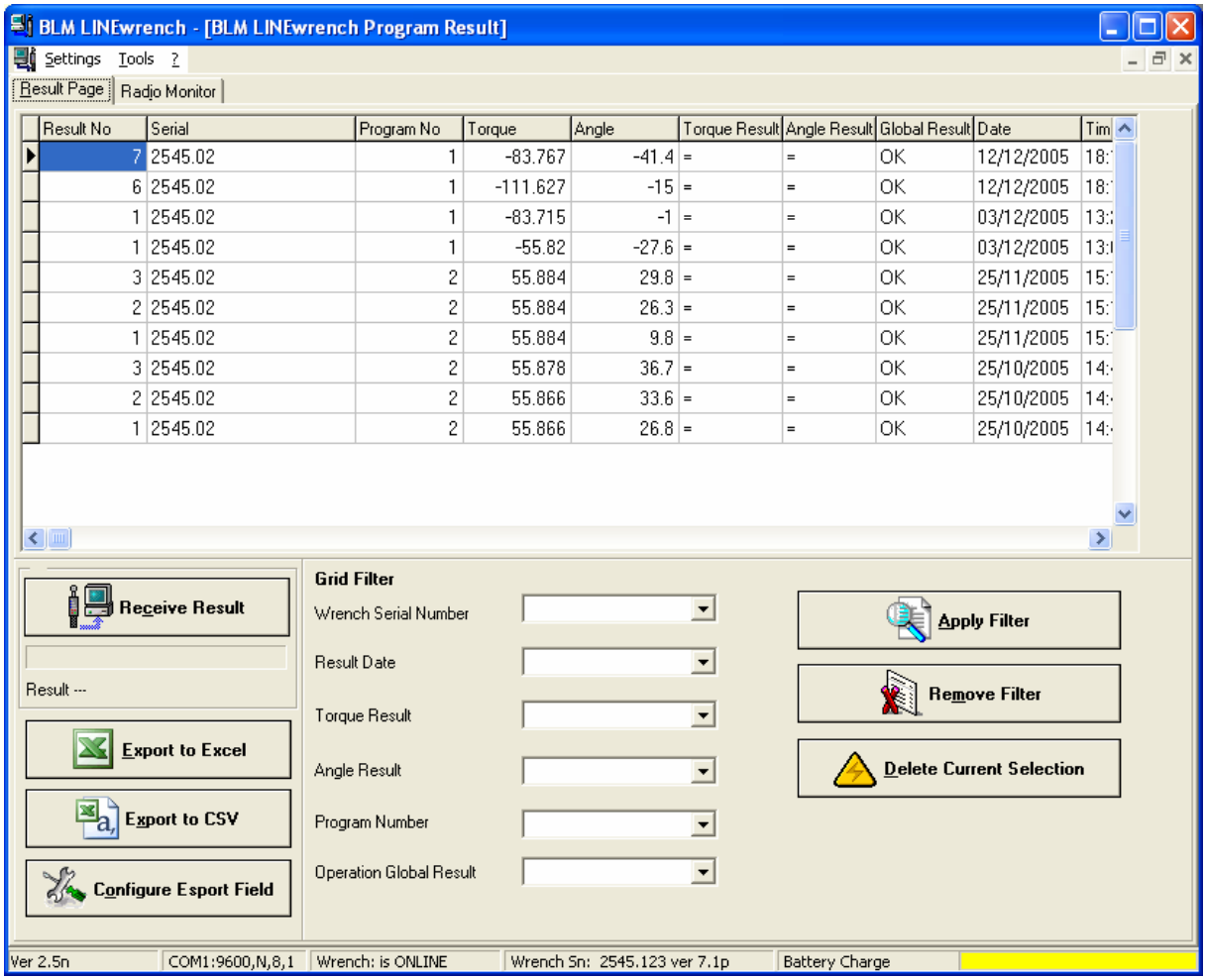
(1) Angle Correction Coefficient: This is the angle at which the tool is turned between the Min Load (see Torque Calibration - **Wrench Settings**) and the max wrench scale value.

(2) Torque Correction Coefficient: This is a multiplying coefficient used to take into account any differences between the tightening axis of the tool and that of the wrench during its calibration in the factory (values higher than 1 raise the torque reading and values below 1 lower it). **In any case, the value entered here must not be 0.**

7. Tightening Results

The tightening results stored on the wrench can be downloaded into the program database via the serial port on the wrench.

7.1 Results Page



The top section of the Results page shows the data in the local program database; the bottom section lets you enable the reception of the results, filter the data shown and export the data in a different format (Excel or CSV).

7.1.1 Receiving results via serial port

You can download the tightening results from a wrench by simply pressing 

. The program then interrogates the wrench: if there are any results in the wrench memory, these are downloaded to the local database and shown in the top section of the page.

Important: you cannot repeat the download once the programs have been downloaded to the local PC database from the wrench. The programs are deleted from the wrench after downloading.

You can select filters to specify which results to show on the grid in the bottom section of the page.

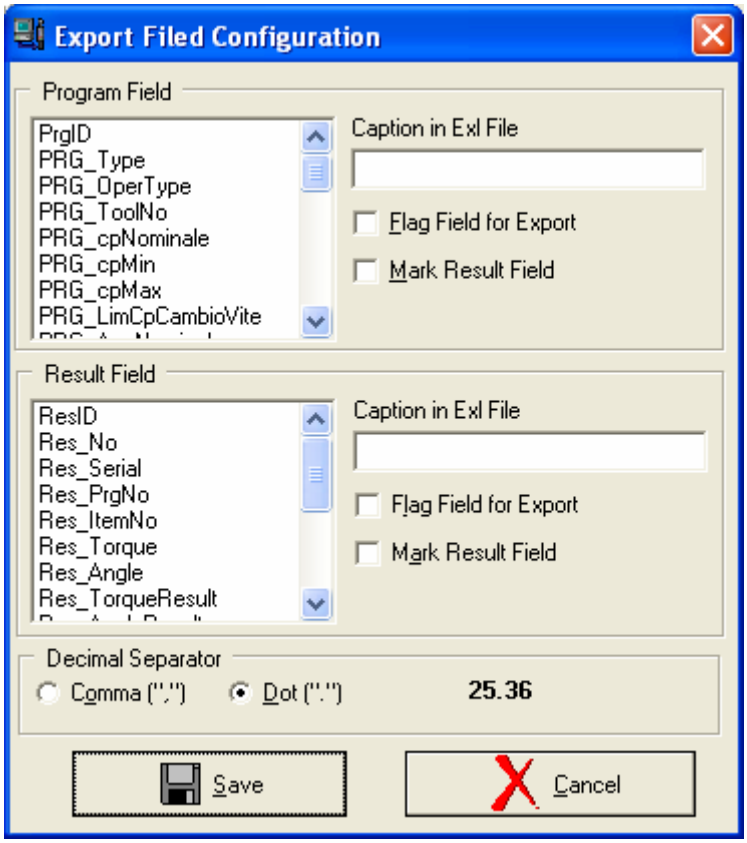
7.1.2 Exporting results

You can export the results downloaded from the wrenches in two formats:
MS Excel: This procedure exports the results as an Excel spreadsheet (if Excel is installed on the PC used for exporting)
CSV: This procedure exports the results in a text file, separating the various fields with ";".

N.B.: If you've used filters to show the results in the grid, these are maintained during exporting.

Press 

to select the fields you want to export (valid for both Excel and CSV exporting).

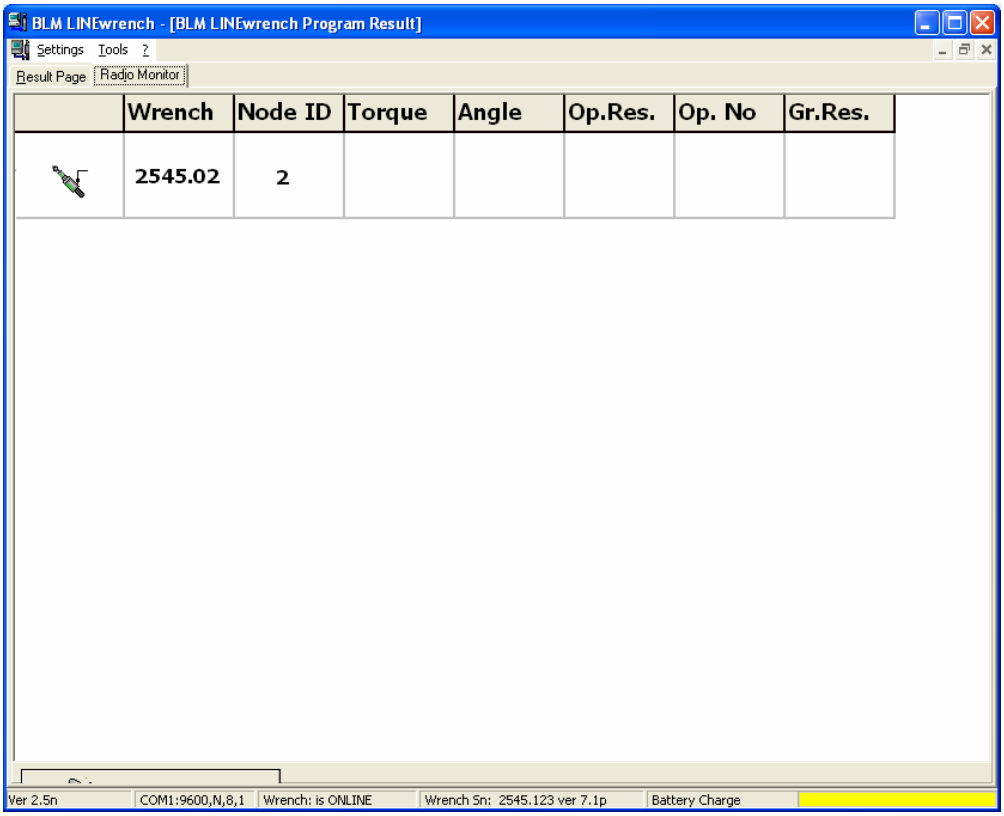


The filter selection page shows the program fields at the top and the results fields at the bottom.
You can thus export the results including (after using the Export option) only those data you want from a specific program (see **Annexes A/B** for the meaning of these fields).

You can also set the name of the exported columns (if exported in Excel) plus the decimal separator to be used for the numerical fields.

8. Receiving results via Radio at 433Mhz

The program allows for direct receipt of a tightening result via radio at 433MHz (if available).



When a wrench is detected by the radio unit connected to the program, this is shown as being connected; the data shown are the wrench serial number, the Node ID (the ID representing the wrench for radio communication) and the relevant data for the last operation performed by the wrench.

After an operation (tightening or unscrewing), the wrench sends the results directly to the receiver connected to the PC; the program shows the results in the grid and saves the operation in the local results database (Results Page).

Notes about radio setup:
Serial Port Setup: see Communication Menu
Wrench Setup: see Wrench Settings

Annex A

Program Table Fields

PrgID	Program ID (ID used in the database)
PRG_Type	Program type (Torque, Angle, Yield…)
PRG_OperType	Operation type (Unscrewing, Tightening,…)
PRG_ToolNo	Number of the Tool to be used
PRG_cpNominale	Nominal Torque
PRG_cpMin	Min torque
PRG_cpMax	Max torque
PRG_LimCpCambioVite	Torque threshold for changing the screw
PRG_AngNominale	Nominal angle
PRG_AngMin	Min angle
PRG_AngMax	Max angle
PRG_CpStartAng	Angle count threshold
PRG_CpSvita	Unscrewing torque
PRG_CpMinSvita	Min unscrewing torque
PRG_AngSvita	Unscrewing angle
PRG_TimeOutAvvita	Tightening timeout
PRG_TimeOutSvita	Unscrewing timeout
PRG_ControlMethod	Control method (used by the program, corresponding to the OperType field)
PRG_Ccc	TCC (torque correction coefficient)
PRG_Cca	ACC (angle correction coefficient)
PRG_Nav	Number of screws in the group
PRG_TReset	Operation required in the event of an error (within a group): repeat just last operation or repeat entire group
PRG_MinAngSvita	Min unscrewing angle
PRG_MaxAngSvita	Max unscrewing angle
PRG_Description	Program description
PRG_Location	Location (if any)
PRG_szStorageFlag	Save data to wrench
PRG_Deleted	Program deleted
PRG_nSet	Program set ID
PRG_szProgramRecognition	Load program from laser scanner
PRG_nCheckTight	Tightening check
PRG_nPrgWrenchId	Program ID

Annex B

Results Table Fields

ResID	Result ID (ID used in the database)
Res_No	Result Number
Res_Serial	Serial number of the wrench used to download the results
Res_PrgNo	Program number used for tightening/unscrewing
Res_ItemNo	Number of the tool used
Res_Torque	Torque value
Res_Angle	Angle value
Res_TorqueResult	Torque results
Res_AngleResult	Angle results
Res_GlobalResult	Global results of the operation
Res_Date	Date of the results
Res_Time	Time of the results
Res_SpeedOverAlarm	SpeedOver results (if the operation has been down too quickly)
Res_ScrewsPosition	Position of the screw within the group (if any)
Res_ScrewsGroup	Number of screws in the group
Res_IDSTAT	Program ID